

Patent claims:

- Sub A2*
- 5 1. A nucleic acid encoding Tetrahymena delta-6-desaturase having an amino acid sequence as depicted in SEQ ID No.: 2, or a functional variant thereof, and parts thereof containing at least 8 nucleotides, with SEQ ID No.: 1 being part of the claim.
 - 10 2. A nucleic acid as claimed in claim 1, which is obtained from a ciliate.
 3. A nucleic acid as claimed in claim 1 or 2, which is obtained from *Tetrahymena thermophila*.
 - 15 4. A nucleic acid as claimed in claims 1-3, which is a DNA or RNA, preferably a double-stranded DNA.
 - 20 5. A nucleic acid as claimed in one of claims 1 to 4, which is a DNA having a nucleic acid sequence as depicted in SEQ ID No.: 1 from position 33 to position 1091.
 - 25 6. A nucleic acid as claimed in one of claims 1 to 5, which contains one or more noncoding sequences.
 - 30 7. An isolated nucleic acid as claimed in one of claims 1 to 6 as depicted in SEQ ID No.: 3, or a functional variant thereof, and parts thereof containing at least 8 nucleotides, with SEQ ID No.: 3 being part of the claim.
 - 35 8. A nucleic acid as claimed in one of claims 1 - 7, which is contained in a vector, preferably in an expression vector.
 9. An expression vector as claimed in claim 8, wherein the nucleic acid is functionally combined

with a constitutive and/or inducible promoter and optionally with a termination signal.

- Sub A2
- 5 10. A process for preparing a nucleic acid as claimed in one of claims 1-7, which comprises synthesizing the nucleic acid chemically or isolating it from a gene library using a probe.
- 10 11. A polypeptide having an amino acid sequence as depicted in SEQ ID No.: 2 or a functional variant thereof, and parts thereof containing at least 6 amino acids.
- 15 12. A process for preparing a polypeptide as claimed in claim 11, which comprises expressing a nucleic acid as claimed in one of claims 1-7 in a suitable expression system or host organism.
- 20 13. An antibody which is directed against a polypeptide as claimed in claim 11.
14. A transgenic organism which harbors a nucleic acid as claimed in one of claims 1 to 10.
- 25 15. A transgenic organism as claimed in claim 11 which is selected from plants or ciliates.
- 30 16. The use of the nucleic acids as claimed in claims 1-7 and/or polypeptides as claimed in claim 11 for enriching delta-6-desaturase-dependent fatty acids in ciliates.
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